Species of Concern
NOAA National Marine Fisheries Service

Bocaccio
Sebastes paucispinus

Photo credit: M. Yoklavich, NMFS.

KEY INFORMATION

Areas of Concern
California waters (possibly west coast of North America).

Year Identified as "Species of Concern"
1999

Factors for Decline
- Overfishing
- Poor environmental conditions

Conservation Designations
IUCN: Critically Endangered
American Fisheries Society: Vulnerable

Brief Species Description:
Bocaccio is a large (up to 3 feet or 90 cm length) piscivorous (fish-eating) rockfish ranging from northern Baja California to Alaska. It is thought to consist of two partially isolated populations: a southern population off California, and a northern population off Washington and British Columbia. They have a distinctively long jaw extending at least to the eye socket. Their back ranges in color from olive- to burnt-orange or brown as adults; its stomach is pink and red. Young bocaccio are light bronze in color and have small brown spots on their sides. Coloring darkens and the spots disappear as they mature. They prefer rocky habitats from 130 to 980 feet (40 to 300 m) deep, but may occur in nearly all habitats. Oil platforms have become somewhat important artificial habitats for this species (Love and York 2006). Young (1-3 yr) bocaccio are relatively **pelagic**, and become more demersal (bottom oriented) with age (maximum age 45 to 50 years). They mature at 4 to 5 years of age. They prefer to eat other rockfishes, but will also eat sablefish, anchovies, lantern fish and squid. They are a component of catches by nearly every fishing gear, and are difficult to avoid. Like other species of their genus, cowcod are internal fertilizers. Mating occurs in the fall (MacCall 2002).

Rationale for "Species of Concern" Listing:

Demographic and Genetic Diversity Concerns:
The main reason for listing was the 97% decline in abundance from about 1970 to the late 1990's (MacCall 2002). Like most long-lived west coast rockfishes (*Sebastes* spp.), productivity is low and the stock is not capable of sustaining "conventional" levels of fishing pressure.

Factors for Decline:
The primary reason for decline is **overfishing**, which ended in the late 1990s (Figure 1). A secondary factor is an adverse environmental regime that was associated with recruitment failures from 1989 to 1998 (Figure 1). Overfishing ended in 1998, and the ocean climate is thought to have returned to "normal" conditions for recruitment, judging by a very strong 1999 year class and evidence of good recruitment since then. A new **stock** assessment in 2005 (MacCall 2005)

indicates that the stock is in better condition than was thought in 2002 (MacCall 2002), and that long-term risk of further decline is low if fishery management plans are adhered to.

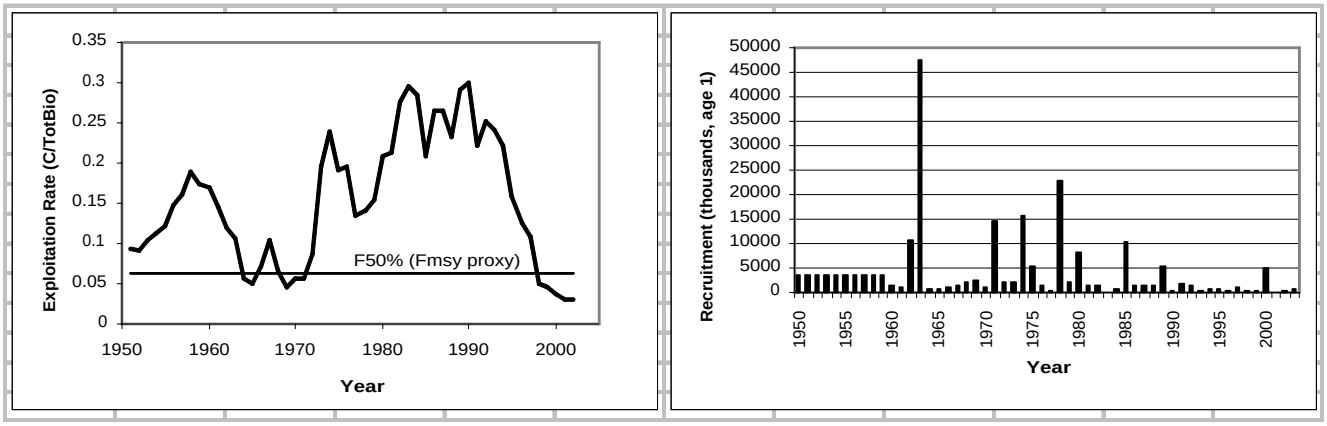

Figure 1. History of exploitation rates (catch/total biomass) of Boccaccio (left), and history of estimated year class strengths (at age 1) of bocaccio (right). NMFS.

Status Reviews/Research Underway:
On January 31, 2001, NMFS received a petition from the Natural Resources Defense Council, Center for Biological Diversity, and Center for Marine Conservation to list the southern population of bocaccio as a threatened species under the Endangered Species Act (ESA). On June 14, 2001, NMFS published its 90-day finding that the petition presented substantial scientific and commercial information indicating that listing may be warranted, and announced the initiation of a formal status review as required by the ESA. NMFS' Southwest Fisheries Science Center prepared a comprehensive status review for bocaccio that recognized a northern "**distinct population segment**" (DPS) and a southern DPS for bocaccio, and this is consistent with the current NMFS and Council management of bocaccio. NMFS' status review focused on the southern DPS, since this was the subject of the petition. The status review indicated that the southern population of bocaccio is at 3.6 percent of its pre-exploitation biomass, or approximately 1.6 million fish. The decline to this low level is due to a combination of overharvest and poor recruitment of young bocaccio into the population. Based on the review, NMFS concluded that listing is not warranted (67 FR 69704, November 19, 2002), but that progress of the Pacific Fishery Management Council's bocaccio rebuilding program should be monitored.

Data Deficiencies:
A dedicated survey effort is need to obtain good biomass estimates. Better understanding of growth and more detailed modeling are needed.

Existing Protections and Conservation Actions:
Although the southern population of bocaccio has substantially declined, NMFS has taken measures to ensure that it will not become endangered within the foreseeable future. The Pacific Fisheries Management Council (Council) has recommended that NMFS eliminate all directed fishing for bocaccio in 2003. The only allowable catch would be bocaccio taken as **bycatch** in other fisheries.

In order to ensure that catch levels are not exceeded, the Council recommended that NMFS implement several management measures in 2003, including new depth-based management measures to prohibit bottom trawls, limit entry of fixed gear, and limit open access fishing in the times and areas where bocaccio are expected to occur. Bocaccio has an 80 percent chance of no further declines in 100 years, and the species is expected to rebuild in approximately 170 years with NMFS' implementation of the Council's proposed measures, in addition to measures being implemented by California. In 2004 a formal rebuilding plan was adopted by the Pacific Fishery Management Council.

References:

Love, M.S. and A. York. 2006. The relationships between fish assemblages and the amount of bottom horizontal beam exposed at California oil platforms: fish habitat preferences at man-made platforms and (by inference) at natural reefs. Fishery Bulletin (Seattle) 104:542-549.

MacCall, A.D. 2002. Status of bocaccio off California in 2002. NMFS, Santa Cruz, CA.

MacCall, A.D. 2005. Status of bocaccio off California in 2005. NMFS, Santa Cruz, CA.

Point(s) of contact for questions or further information:

For further information on this Species of Concern, or on the Species of Concern Program in general, please contact NMFS, Office of Protected Resources, 1315 East West Highway, Silver Spring, MD 20910, (301) 713-1401, soc.list@noaa.gov; http://www.nmfs.noaa.gov/pr/species/concern/, or Dr. Scott Rumsey, NMFS, Northwest Region, Protected Resources Division, 525 NE Oregon Street #500, Portland, OR 97232, (503) 872-2791, Scott.Rumsey@noaa.gov.